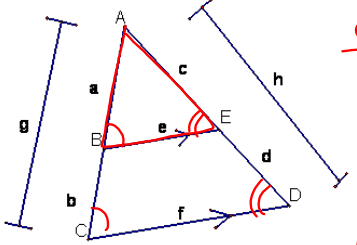
6.4 Parallel lines and proportional parts

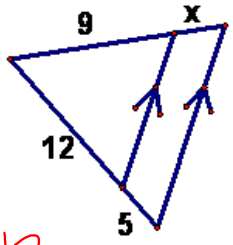
Theorem 6.4-Triangle Proportionality Theorem-If a line is parallel to one side of a triangle and intersects the other two sides in two distinct points, then it separates these sides into segments of proportional lengths.



$\frac{a}{g} = \frac{e}{f} = \frac{c}{h}$

$\frac{a}{b} = \frac{c}{d}$

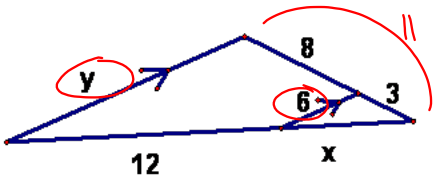
If solving for a // side then $\frac{\triangle}{\triangle}$ (for proportion)



$\frac{12}{5} = \frac{9}{x}$

$12x = 45$

$x = 3.75$



$\frac{3}{8} = \frac{x}{12}$

$8x = 36$

$x = 4.5$

$\triangle$s for parallel sides

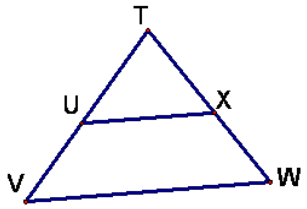
$\frac{6}{y} = \frac{3}{11}$

$y = 22$

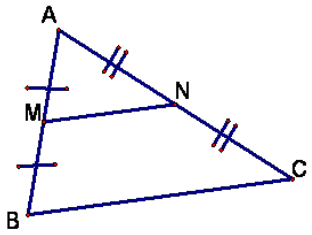
Theorem 6.5-Converse of the triangle proportionality Theorem-
If a line intersects two sides of a triangle and separates these sides into segments of proportional length then the line is parallel to the third side.

If $\frac{TU}{UV} = \frac{TX}{XW}$

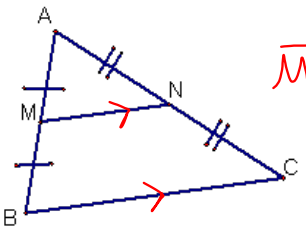
then $\overline{UX} \parallel \overline{VW}$



Midsegment-of a triangle is a segment whose endpoints are the midpoints of two sides of a triangle.

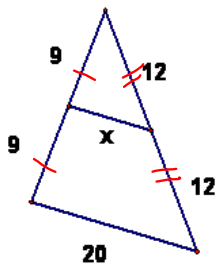


Theorem 6.6-Triangle Midsegment theorem-A midsegment of a triangle is parallel to one side of the triangle, and its length is ½ the length of that side.



$\overline{MN} \parallel \overline{BC}$

$MN = \frac{1}{2}BC$

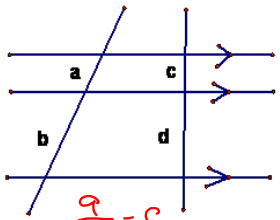


$x = \frac{1}{2}20$

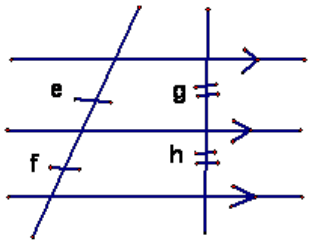
$x = 10$

Corollary 6.1-If three or more parallel lines intersect two transversals, then they cut the transversals proportionally

Corollary 6.2-If three or more parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal.

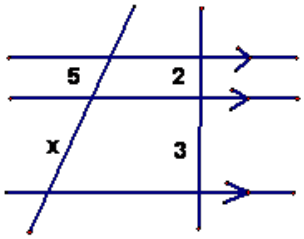


$\frac{a}{b} = \frac{c}{d}$



$e = f$

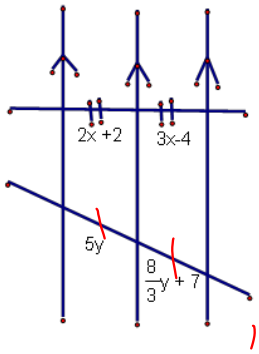
$g = h$



$\frac{5}{x} = \frac{2}{3}$

$2x = 15$

$x = 7.5$



$2x + 2 = 3x - 4$

$6 = x$

$\frac{5}{1}y = \frac{8}{3}y + 7$

$\frac{15}{3}y - \frac{8}{3}y = 7$

$\frac{3}{7} \cdot \frac{7}{3}y = 7 \cdot \frac{3}{7}$

$y = 3$

6.5

Parts of Similar Triangles

Ex:

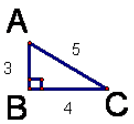
Scale factor 1:2

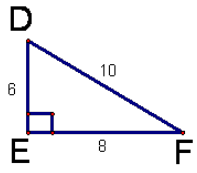
ΔABC P= 12

ΔDEF P= 24

Ratio of perimeters

$\frac{12}{24} = \frac{1}{2}$

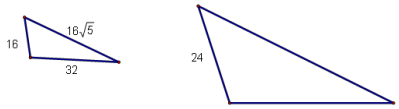




Theorem 6.7-Proportional Perimeters Theorem-If two triangles are similar, then the perimeters are proportional to the measures of the corresponding sides.

The △s are ~.

Find the perimeter of the larger △



$P = 16+32+16\sqrt{5}$

$P = 48+16\sqrt{5}$

$\frac{1}{2}\frac{16}{24} = \frac{48+16\sqrt{5}}{P}$

$P = 3(24+8\sqrt{5})$

$72+24\sqrt{5}$

Special segments of similar triangles

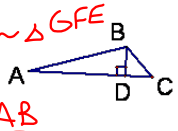
Theorem 6.8-If two triangles are similar, then the measures of the corresponding **altitudes** are proportional to the measures of the corresponding sides.

Theorem 6.9-If two triangles are similar, then the measures of the corresponding **angle bisectors** are proportional to the measures of the corresponding sides.

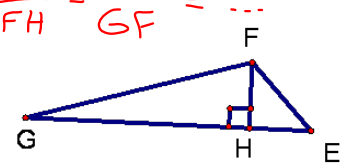
Theorem 6.10-If two triangles are similar, then the measures of the corresponding **medians** are proportional to the measures of the corresponding sides.

Thm. 6.8

$\triangle ABC \sim \triangle GFE$



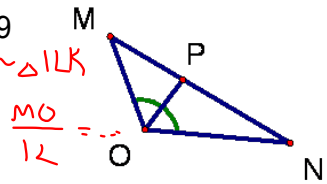
$\frac{BD}{FH} = \frac{AB}{GF} = \ldots$

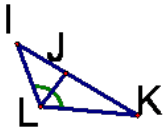


Thm. 6.9

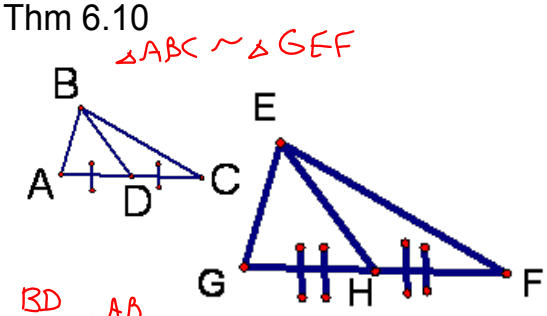
$\triangle MON \sim \triangle IJK$

$\frac{OP}{LJ} = \frac{MO}{IL} = \ldots$





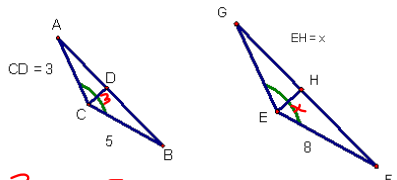
Thm 6.10



$\triangle ABC \sim \triangle GEF$

$\frac{BD}{EH} = \frac{AB}{GE} = \ldots$

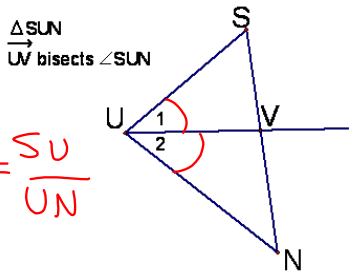
$\triangle ABC \sim \triangle GFE$ What is EH?



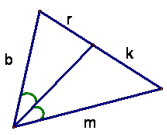
$\frac{3}{x} = \frac{5}{8}$

$4.8 = x$

Theorem 6.11-Angle Bisector Proportion Theorem-an angle bisector in a triangle separates the opposite side into segments that have the same ratio as the other two sides.

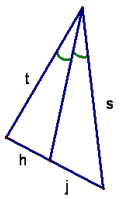


$\frac{SV}{VN} = \frac{SU}{UN}$

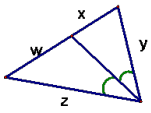


$\frac{r}{k} = \frac{b}{m}$

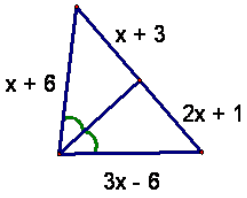
$\frac{m}{k} = \frac{b}{r}$

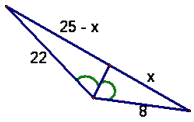


$\frac{h}{s} = \frac{t}{j}$



$\frac{x}{w} = \frac{y}{z}$





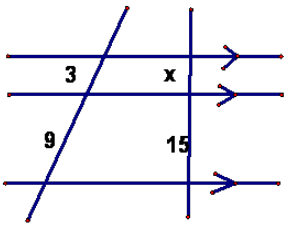
$\frac{25-x}{x} = \frac{22}{8}$ 11 4

$4(25-x) = 11x$

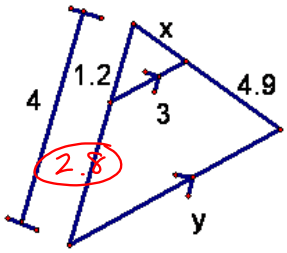
$100 - 4x = 11x$

$100 = 15x$

$6\frac{2}{3} = x$



$\frac{3}{9} = \frac{x}{15}$

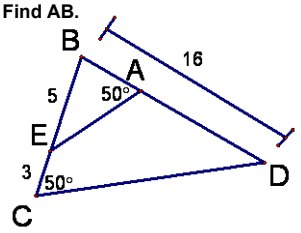


$\frac{x}{4.9} = \frac{1.2}{2.8}$

11 s, 60 $\frac{\Delta}{\Delta}$

$\frac{3}{y} = \frac{1.2}{4}$

Find AB.



△ABE ~ △CBD

HW
p312-313 #s 14,15, 17, 21, 34

p320-321 #s 10, 11, 14, 22-24

HW
p312-313 #s 14-18, 20, 21, 33, 34
p320-321 #s 10, 11, 14, 22-24